

REMARKS/ARGUMENTS

Reconsideration of the present application, as amended, is respectfully requested.

A. Status of the Claims

As a result of the present amendment, claims 1-9 are presented for continued prosecution.

Claim 1 has been amended to clarify the reference numerals which identify the entrance/exit surface. Support for this amendment can be found, for example, in lines 25-26 on page 3 of the application.

Claim 1 has been amended to clarify the reference numeral which identifies the magnetic flux lines. Support for this amendment can be found, for example, in line 25 on page 3 of the application.

Claim 2 has been amended to delete the preferred range. This subject matter has been recovered in new claim 9.

Claims 4 and 5 have been amended to correct improper multiple dependency.

New claims 6-8 have been added. Support for new claim 6 can be found, for example, in claim 4. Support for new claims 7 and 8 can be found, for example, in claim 5.

B. Drawings Objections and Amendments

In section 1 of the Office Action, the Examiner objected to the drawings because Figs. 1 and 2 are not identified as prior art. Applicant has attached a replacement sheet of drawings which indicates that Figs. 1 and 2 are prior art.

In section 2 of the Office Action, the Examiner objected to the drawings because Figs. 5 and 6 include reference numerals 10 and 11 which are not mentioned in the specification. The attached clean copy of the substitute specification includes reference numerals 10 and 11 in lines 4-5 on page 4.

C. Specification Objections and Amendments

The Examiner objected to the specification in section 3 of the Office Action for not including section headings. Applicant has provided a clean copy and a marked-up copy of a substitute specification which includes section headings.

In section 4 of the Office Action, the Examiner questioned whether Fig. 3 is prior art or part of the invention. The substitute specification clarifies that Fig. 3 is part of the invention.

D. Claim Objections and Amendments

The Examiner objected to claims 4 and 5 for being improper multiple dependent claims. Claims 4 and 5 have been amended as correction.

E. The Invention

The present invention, as defined by the amended claims, includes a magnetic separator with permanent magnets. In one of the novel aspects of the invention, the magnetic separator includes a ferromagnetic member for a circuit connection between at least two magnetic poles. Each magnetic pole includes a ferrite magnet in the bottom portion in contact with a ferromagnetic member for a circuit connection between the poles, and a rare earth magnet in the top portion to represent an entrance/exit surface of magnetic flux lines.

F. Claim Rejections under 35 U.S.C. § 102(e)

Claims 1 and 3-5 had been rejected as being anticipated by Gleckner (U.S. 6,850,140).

In order to maintain an anticipation rejection under 35 U.S.C. § 102, the prior art must disclose each and every element of the rejected claims with sufficient clarity to prove its existence in the prior art. Applicant respectfully submits that Gleckner does not anticipate the claimed invention for at least the following reasons.

1. Gleckner does not teach or suggest a magnetic separator with permanent magnets

The present invention is directed to a magnetic separator with permanent magnets as recited in claim 1. Magnetic separators of the type disclosed by the present invention can be used in many applications where it is necessary to attract and separate ferromagnetic materials of any shape and size from a mixed material (see lines 11-13 on page 1 of the application as filed).

The magnetic separator of the present invention is in a completely different industrial field compared to the magnetic roll of Gleckner. The magnetic roll of Gleckner is intended for use in the reprographics industry to convey toner powder from a container onto a photoreceptor (see col. 1, lines 20-60 and col. 2, lines 16-18 of Gleckner). Artisans skilled in the field of

magnetic separation would not find it obvious to apply teachings from the art of image reproduction and, vice versa, it would not be obvious for a person skilled in the art of image reproduction to look for teachings in the field of magnetic separation.

As a matter of fact, the needs and requirements of these two fields are quite opposite since the magnetic rolls of Gleckner exhibit greater magnetic field strength than ferrite magnets alone, and a substantially more uniform magnetic field in the direction outward from and normal to the layer of ferrite magnet than the magnetic field exhibited by the rare earth magnet alone (see col. 2, lines 10-15, lines 24-28, lines 39-47; and col. 3, lines 6-24 of Gleckner). In contrast to Gleckner, the present invention relates to magnetic separation where magnetic field uniformity is not important, and it goes against the optimization of the gradient that is achieved by using a bipole magnet that increases the field disuniformity and also gradient and separation performance. In fact, a bipole is used in the magnetic separator of the present invention instead of a monopole as in Gleckner, in order to increase the gradient which is important during in magnetic separation. A bipole magnet means a positive and negative Gauss reading value is obtained to increase gradient, which goes against the magnetic field uniformity strongly looked for in Gleckner (*"magnetic field uniformity remains of paramount concern"*, see col. 7, lines 7-8 of Gleckner). Gleckner therefore actually teaches away from the contents of the present invention, which clearly demonstrates that Gleckner does not teach or suggest a magnetic separator.

In addition to the above, further proof of the differences between the industrial field of Gleckner and the present invention is in the list of possible uses of Gleckner's layered magnets at col. 6, lines 17-22. Gleckner explains that his magnets may be used to make magnetic rolls for the reprographics industry, advertising specialties (signs and labels), micromotor magnets, linear motors, actuators, medical MRI machines, biomedical, surgical drapes, car ski-rack restraint systems, and automotive sound deadening systems. No mention whatsoever is made of magnetic separation.

Applicant respectfully submits that Gleckner does not teach or suggest a magnetic separator and therefore does not anticipate claim 1.

2. Gleckner does not teach or suggest a ferromagnetic member for a circuit connection between at least two magnetic poles

Claim 1 recites that the magnetic separator includes a ferromagnetic member 2 for a circuit connection between at least two magnetic poles 3C.

This aspect of the invention is illustrated, for example, in Fig. 4 and described in lines 21-28 of the application as filed. As shown and described therein, two poles 3C North-South each have bottom portions made up of ferrite magnets 12. Each individual ferrite magnet 12 contacts ferromagnetic member 2. Ferromagnetic member 2 therefore establishes a circuit connection between the two poles 3C North-South.

The Examiner cited element 11 of Gleckner to teach the claimed ferromagnetic member. Element 11 of Gleckner, however, is not a ferromagnetic member for a circuit connection between two poles. Rather, element 11 is just an additional layer of layered magnets 12, 14, which may include ferritic or rare earth magnetic material (see col. 5, lines 26-35 of Gleckner). The additional layer 11 may be superposed on the ferritic magnet 12 as illustrated in Fig. 2 of Gleckner, or it may be located between the ferritic magnet 12 and the rare earth magnet 14 (see col. 5, lines 26-35 of Gleckner). Thus, in contrast to claim 1 and the embodiment illustrated in Fig. 4 of the present application, additional layer 11 of Gleckner does not contact two ferrite magnets for a circuit connection between two poles.

Gleckner does not teach or suggest a ferromagnetic member for a circuit connection between two poles as recited in claim 1. Applicant therefore respectfully submits that Gleckner does not teach or suggest each and every element of the claimed invention as required to maintain an anticipation rejection under § 102.

3. Gleckner does not teach or suggest at least two magnetic poles connected by a ferromagnetic member

Claim 1 recites that a circuit connection is made between at least two magnetic poles connected by a ferromagnetic member.

As illustrated, for example, in Fig. 3 of the application, the magnetic separator includes at least two magnetic poles 3C, wherein each magnetic pole 3C has a ferrite magnet 12 and a rare earth magnet 14. The ferrite magnets 12 of the magnetic poles 3C are connected by

ferromagnetic member 2. A circuit connection is established between magnetic poles 3C as illustrated in Fig. 4 of the application.

The Examiner cited ferritic magnet 12 and rare earth magnet 14 of Gleckner to teach the claimed at least two magnetic poles. Applicant respectfully disagrees with the rejection. Ferritic magnet 12 and rare earth magnet 14 of Gleckner are not two individual magnetic poles, but are two superposed layers of a single magnetic pole. The layered single magnetic pole of Gleckner is repeatedly described and illustrated (see, for example, col. 4, lines 23-28, col. 5, lines 9-11; col. 6, lines 25-29; and Figs. 4-5).

In contrast to claim 1, Gleckner does not teach or suggest at least two magnetic poles connected by a ferromagnetic member. Applicant respectfully submits that claim 1 is not anticipated by Gleckner.

4. Gleckner does not teach or suggest ferrite magnets in the bottom portion in contact with a ferromagnetic member, and rare earth magnets in the top portion for an entrance/exit surface of magnetic flux lines

Claim 1 recites that each magnetic pole is made up of ferrite magnets 12 in the bottom portion and rare earth magnets 13 in the top portion.

This aspect of the invention can be seen in Figs. 3-4. As illustrated therein, ferrite magnets 12 are in the bottom portion which contacts ferromagnetic member 2, and rare earth magnets 13 are in the top portion for an entrance/exit of magnetic flux.

In an opposite manner to claim 1, Gleckner teaches ferritic magnets 12 in the top portion and rare earth magnets 14 in the bottom portion. This aspect of Gleckner is described in, for example, the abstract; col. 2, lines 8-10 and 19-21; col. 4, lines 23-28; and col. 6, lines 25-29. In particular, Figs. 5(a)-5(c) of Gleckner illustrate ferritic magnet 12 in the top portion and rare earth magnet 14 in the bottom portion.

Applicant therefore respectfully submits that Gleckner does not teach or suggest each and every element of the claimed invention as required to maintain an anticipation rejection under § 102.

5. Gleckner does not teach or suggest a protective casing filled with a blocking resin

Claim 3 recites that the ferromagnetic cylinder 2 is enclosed by a protective casing 4 filled with a blocking resin 5.

This aspect of the invention can be seen, for example, in Fig. 3. As shown therein, blocking resin 5 fills spaces between ferromagnetic cylinder 2 and protective casing 4. The Examiner cited Fig. 4 and col. 5, lines 8-21 of Gleckner to teach the limitations of claim 3. Applicant respectfully disagrees with the Examiner's reading of Gleckner.

Gleckner does not teach the claimed blocking resin. First, as shown in Fig. 4 of Gleckner, cylindrical core 26 fills casing 30 without leaving any empty space for a blocking resin. Second, the cited col. 5, lines 8-21 of Gleckner explains that the resin is an adhesive used in bonding layer 16 which joins the ferritic magnet 12 to the rare earth magnet 14. Thus, the resin of Gleckner is between a ferritic magnet 12 to a rare earth magnet 14, not between a ferromagnetic cylinder and a protective casing.

Gleckner does not teach or suggest the claimed blocking resin. Applicant respectfully submits that claim 3 is not anticipated by Gleckner.

G. Claim Rejections under 35 U.S.C. § 103(a)

Claim 2 had been rejected as being unpatentable over Gleckner. A rejection under § 103 is proper when the differences between the claimed invention and the prior art would have been obvious to a person of ordinary skill in the art at the time the claimed invention was made.

Claim 2 recites that the ratio between the effective magnetic length of the ferrite magnets and of the rare earth magnets is between 1:1 and 3:1. Gleckner teaches that the ratio of the thickness of the ferritic magnet to the rare earth magnet is preferably between 1:3 and 1:5 (see col. 5, lines 62-64 of Gleckner). The Examiner stated Gleckner discloses the general conditions of claim 2, and that the ratio of claim 2 would therefore have been obvious through routine experimentation. Applicant respectfully disagrees.

The claimed ratio is radically different from the ratio disclosed by Gleckner. In claim 2, it is the ferritic magnet that is equal to or thicker than the rare earth magnet, whereas in Gleckner it is exactly the opposite. Thus, Applicant disagrees that the general conditions of claim 2 are disclosed by Gleckner. As a matter of fact, the invention claims a thickness ratio of the ferritic magnet to the rare earth magnet that is from 3 to 15 times greater than the prior art ratio

disclosed by Gleckner. It is therefore believed that the range of claim 2 would not have been obvious and that claim 2 is patentable over the teachings of Gleckner.

H. Fees

This Response is being filed within the shortened statutory period for reply. No fee is believed to be due. If, on the other hand, it is determined that fees are due or any overpayment has been made, the Assistant Commissioner is hereby authorized to debit or credit such sum to Deposit Account No. 02-2275. Pursuant to 37 C.F.R. 1.136(a)(3), please treat this and any concurrent or future reply in this application that requires a petition for an extension of time for its timely submission as incorporating a petition for extension of time for the appropriate length of time. The fee associated therewith is to be charged to Deposit Account No. 02-2275.

I. Conclusion

In view of the actions taken and arguments presented, it is respectfully submitted that each and every one of the matters raised by the Examiner has been addressed by the present amendment and that the present application is now in condition for allowance.

An early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

LUCAS & MERCANTI, LLP

By:


Timothy D. Meade
Registration No. 55,449

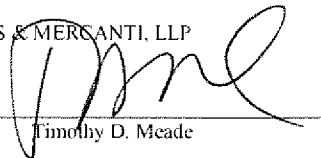
LUCAS & MERCANTI, LLP
475 Park Avenue South
New York, NY 10016
Phone: 212-661-8000
Fax: 212-661-8002

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LUCAS & MERCANTI, LLP

By:


Timothy D. Meade